Model 3000

&

ACCESS 4000

SECURITY, ACCESS CONTROL & BUILDING AUTOMATION SYSTEM

INSTALLATION MANUAL

OVERVIEW

The 3000/Access 4000 provides the next generation in Access Control, Security and Building Automation Systems.

MODULAR DESIGN & EXPANDABILITY Modular hardware design provides the ability to adapt and expand a system to cater for virtually any configuration or application required - small or large. Large numbers of LCD Terminals, Input/Output Expanders and Reader Modules can share a secure, monitored LAN system utilizing a fast, efficient communications format. Using the recommended cabling, modules on the LAN can be installed hundreds of metres from the Control Module. Up to 250 modules can be connected on the LAN system, comprising up to 99 modules of any particular type. With the current range of modules available, this arrangement can provide over 3000 Zone inputs and over 3000 Auxiliaries on a single system.

THE MODULES. The heart of the system is the Control Module. This unit stores all data, communicates with all other modules connected to the system LAN, and reports alarms and system activity to the Central Station. To program and operate the system an Elite LCD Terminal is normally used. The LCD Terminal provides a 20 key backlit keypad, a backlit Liquid Crystal Display and connections for several Zone Inputs and Auxiliary outputs.
Universal Zone Expanders are used to provide additional Inputs (16 or 32), Sirens and Auxiliaries (8 or 32) in a system and can be installed remotely in suitable locations to greatly reduce the amount of cabling required to detectors and output devices. The Mini Expander Module provides low cost expansion when up to 8 Zones and Auxiliaries are required along with special event counting options (Event Counting available V3 or later).
Reader Modules are installed near the Door/s to provide Reader interfacing and up to 7 Inputs and 5 outputs for complete monitoring and control of the Door/s.
The Analogue Module (using V3 or later Control Module firmware) allows analogue values to be monitored and set points used to trigger control and/or report functions.

SYSTEM MANAGEMENT. PCDirect Upload/Download software is available for system Programming and Management, allowing the option of local or remote connection with operator password protection. Windows based system management software is also available incorporating dynamic graphics capabilities and sophisticated monitoring and report generation facilites.

Contents

CONTROL MODULE PARTS LIST 2

MOUNTING CONTROL MODULES AND EXPANDERS 3

WIRING DIAGRAMS 3-5

THE CONTROL MODULE PCB
Link Details 6
Wiring Terminal Details 6
Header Connector Details 6
MENU FLOWCHART 7
Control Module PCB layout ..... 8 & 9
Control Module Fault LED indications 9
Expander/Reader Module Fault LED indications 9
LCD Terminal Error Messages 9

LAN SYSTEM OVERVIEW 10
Connecting Modules to the LAN ..... 10 & 11
Cabling Details 12
System Earthing 12
System cabling configuration 13
LAN Termination Details 13
Troubleshooting Flowchart ..... 14 & 15
LAN Voltage Testing 16

Installing your Model 3000 / Access 4000 system.

Control Module Parts List

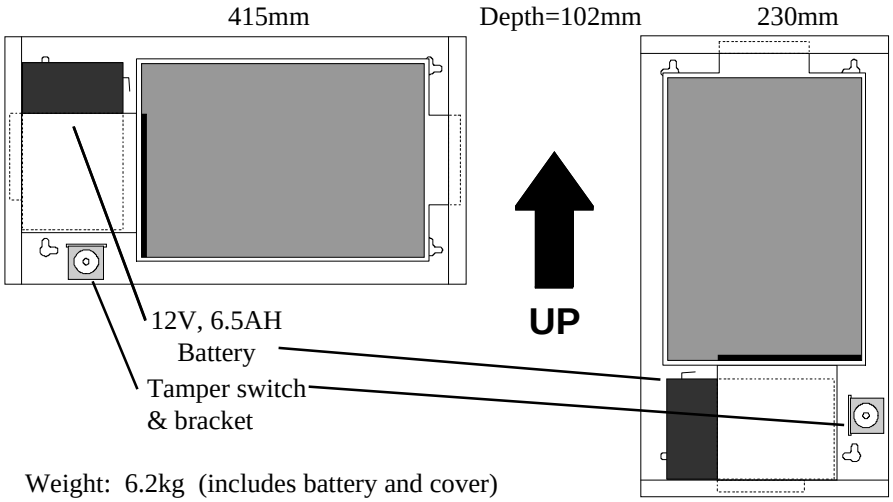
- Control Module PCB mounted on metal sub-chassis in metal box.
- Tamper switch bracket.
- Telephone line cable.
- Installation Kit containing:
  - Plug pack.
  - 7 x plastic “D” bungs.
  - 7 x 8 Way plug-on screw terminals.
  - Tamper switch.
  - 2 x 6.3mm Tamper switch connectors.
  - 2 x 4.8mm Battery terminal connectors.
  - 1 x 2 Amp Fuse.
  - 20 x 2k2 End-of-line resistors. (red-red-black-brown-brown)
  - 20 x 6k8 End-of-line resistors. (blue-grey-black-brown-brown)
- Spiral bound User Manual.
- User’s Quick Reference Card. (4 page booklet)
- Installation Manual. (This document)

Disclaimer: 1. The manufacturer &/or it’s agents take no responsibility for any damage, financial loss or injury caused to any equipment, property or persons resulting from the correct or incorrect use of the system or it’s peripherals. The purchaser assumes all responsibility in the use of the system and it’s peripherals.
2. While every effort has been made to ensure the accuracy of this manual, the manufacturer assumes no responsibility or liability for any errors or omissions. Due to ongoing development, this manual is subject to change without notice.

Mounting the Control Module & Zone Expanders

(Enclosure may vary - Australian enclosure illustrated)

- The Control Module and Zone Expanders are supplied in metal boxes which must be secured to a flat, vertical surface using fasteners through the four mounting holes in the chassis.
- The tamper switch bracket must be positioned through the slot in the chassis, before the chassis is secured to the wall.
- Orientation of the box MUST be as per one of the illustrations below.
- Installation environment should be maintained at a temperature of 0º to 40º Celsius and 15% to 85% Relative humidity (non-condensing)

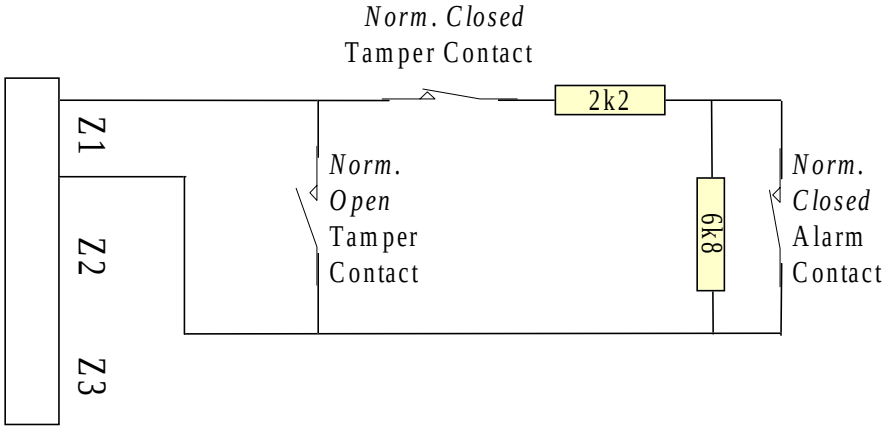


Weight: 6.2kg (includes battery and cover)

Wiring Diagrams

ZONE INPUT WIRING

Typical Detection devices with *Normally Closed* Alarm contacts and *Normally Closed* **OR** *Normally Open* Tamper Contacts are wired as follows:



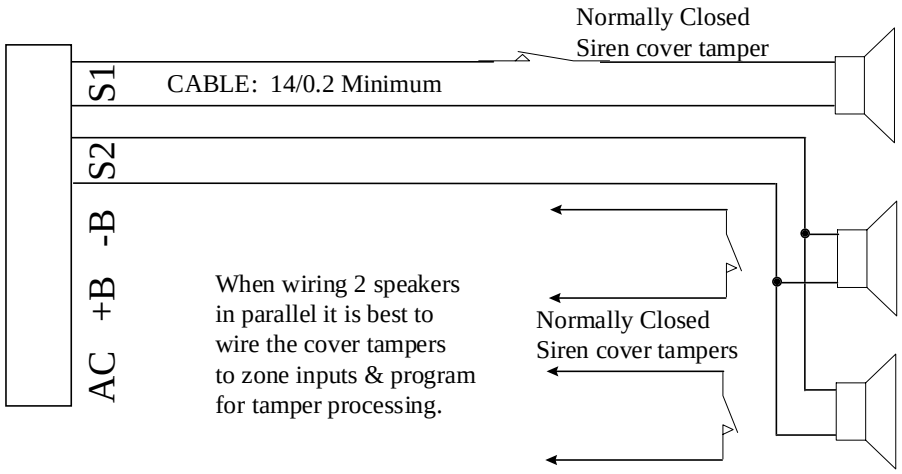
INPUT STATES:		
2k2	=	Sealed
9k (2k2 + 6k8)	=	Unsealed (or Alarm)
Open Circuit	=	Tamper
Short Circuit	=	Tamper

Detection devices with *Normally Open* Alarm contacts are wired in exactly the same manner as above. When programming the Zone Input, however, the option to "Reverse Seal and Alarm conditions" must be set to [Y]es.
e.g.

E01:Z01	X S R A N T . .
Options ->	n Y n n n n n n

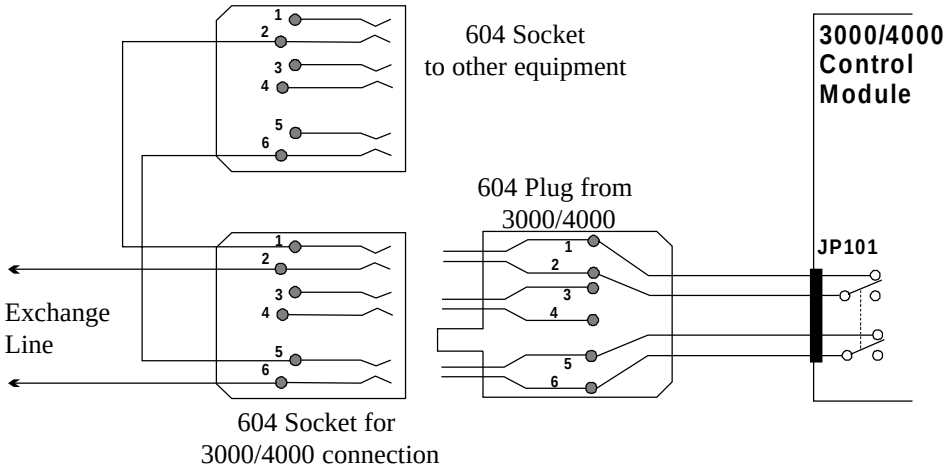
SIREN WIRING

Maximum of two 8 Ohm Siren speakers may be connected to each siren driver, wired in parallel. Norm. Closed Siren cover Tampers may be wired in series with the speaker cable. This method utilizes the siren speaker circuit monitoring.



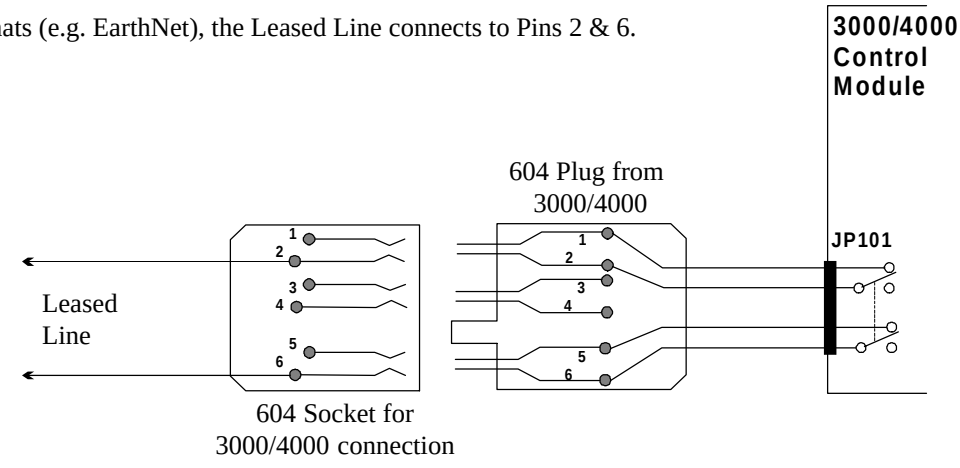
DIALLER LINE

Mode 3 socket wiring diagram for Dialler reporting formats. (e.g. IRfast and Contact ID)
Phone Line IN: Pins 2 & 6
Phone Line OUT: Pins 1 & 5



DIRECT LINE

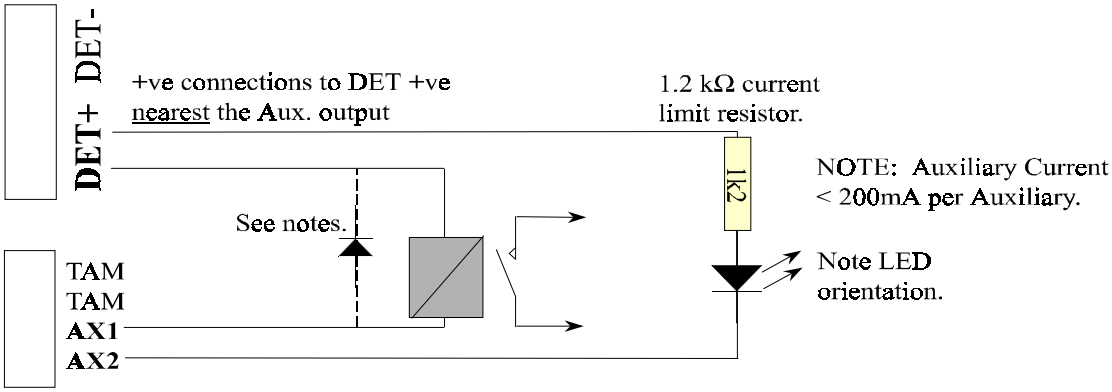
For Direct Line formats (e.g. EarthNet), the Leased Line connects to Pins 2 & 6.



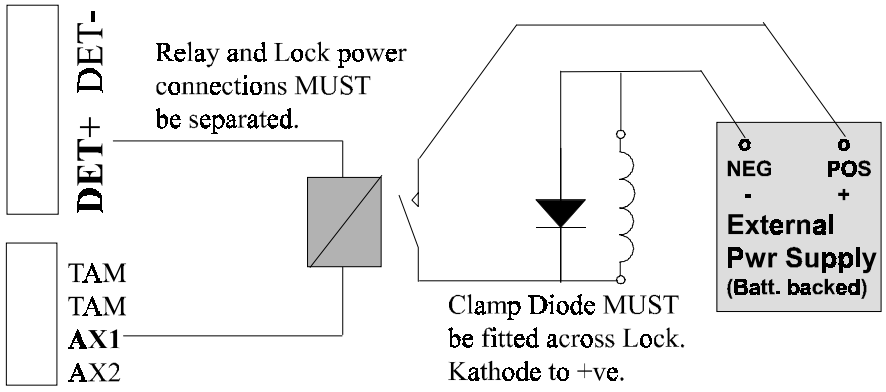
AUXILIARY WIRING

Rules for Auxiliary wiring on any module in the 3000/Access 4000 system.

- Aux's 1 & 2 on Control & Expander Modules can switch up to 500mA continuous and are suitable for inductive loads. (Except for Lock strikes, etc.)
- Max current on any other individual Auxiliary must be less than 200mA.
- On any module with Plug pack; Auxiliaries + LAN current + Detectors must be less than 700mA, or an external power supply should be used.
- The Positive connection of the device must be wired back to the Positive connection nearest the Auxiliary. i.e. On the same module.
- If an external power supply is used to power the device, a good common Negative connection MUST exist between the power supply and the module.
- Clamp diode should be fitted across inductive loads. Kathode (bar) to +ve.



Locks are activated via a relay. External power supply is used for lock power to prevent voltage spikes reaching the Concept equipment, provide longer battery backup & minimise the possibility of earth loops.



LINKS

LK2 RAM configuration. 1-2 32k DS1230Y (28 Pin)
2-3 128k DS1245Y (32 Pin)
2-3 512k DS1247Y (32 Pin)

LK3 Installer Code Default. Disconnect AC and Battery from Control Module; Short LK3 Pins; Reconnect power, then remove the short. Installer code will be defaulted to "01".

LK4 Continue. Used when required to rectify Memory problems.
CAUTION! Will erase all programming if shorted to initialise memory.

LK102/
LK103 Special. Only changed if advised by the Distributor.

LK104/ PSTN / Direct Line selection.
LK105 Both links 1-2 Direct Line (e.g. EarthNet)
Both links 2-3 PSTN (Dialler formats: IRfast, Contact ID, etc.)

LK201 Regulated Power Supply Current Limit setting.
No Link 1.0 Amp. Normal setting for Plug pack connection.
Link IN 1.5 Amp. Special custom external supply used.

LK202 LAN Termination. No Link. Unterminated. Link not fitted unless unit is first or last module on the LAN system.
Link IN. Terminated. Link fitted when unit IS the first or last module on the LAN system.
(See "LAN SYSTEM" details beginning on page 10 of this manual for more information)

TERMINALS

T205 POS, NEG, A, B — LAN connections. *(See "LAN SYSTEM" details in this manual for more information)*
AX1 Auxiliary output 1
AX2 Auxiliary output 2 *(See "AUXILIARY WIRING" in this manual for wiring diagrams)*
TAM Terminals for connection of cabinet tamper switch. No End-of-line resistors necessary.

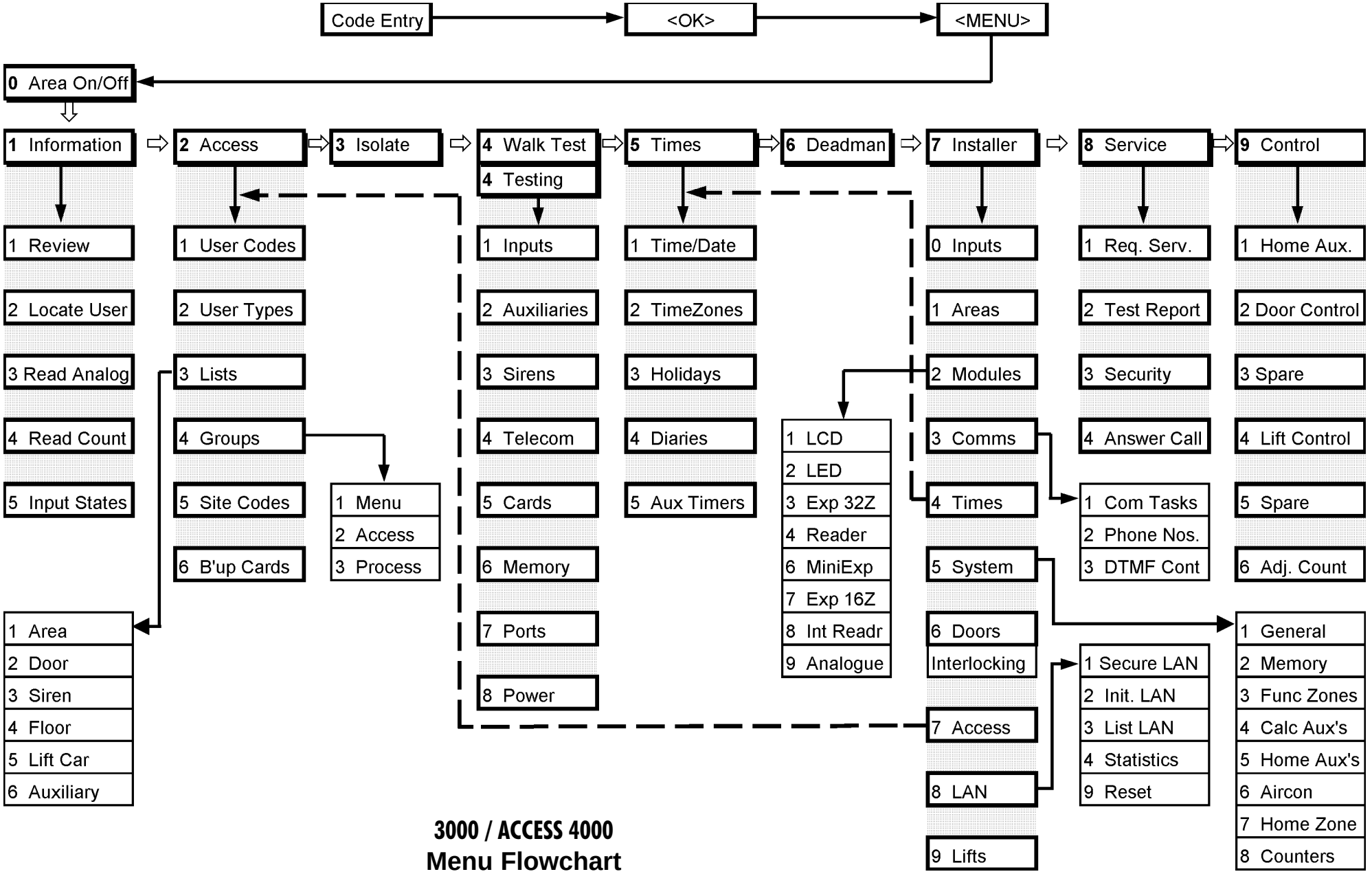
T206 Positive and Negative Detector Power connections. Note that total current drawn by devices connected to these terminals, plus devices connected to Auxiliaries and the LAN power connections, must not exceed 700mA.

T207 AC Terminals for 16Volt AC Plug pack connection. (supplied)
Plug pack specs: Input: 240VAC RMS +/-5%.
Output: 16VAC RMS 1.5A
+B Positive connection to 12Volt 6.5 AH Battery.
-B Negative connection to 12 Volt 6.5 AH Battery.
S1 "Internal" monitored Siren speaker connections. *See "SIREN WIRING" on p4 for wiring diagrams.*
S2 "External" monitored Siren speaker connections. *See "SIREN WIRING" on p4 for wiring diagrams.*

HEADERS

JP1 Port 0 connection. Using the "Port 0 Interface cable" (IRU3000), allows temporary connection of a PC for Upload/ Download programming. This Port shares the on-board modem with the Line interface and therefore MUST NOT be used as a permanent connection.

JP2 Header for connection of IRPX3000 UART Port Board. A UART Board and appropriate cable/s must be fitted if Printer, PC, External Modem or Securitel Interface etc. is being used. When fitting the UART board, disconnect power and battery from the Control module and align the connectors carefully.



3000 / ACCESS 4000
Menu Flowchart

THE CONTROL MODULE PCB

LK3 Installer Code Default

LK4 "Continue" Caution. See notes.

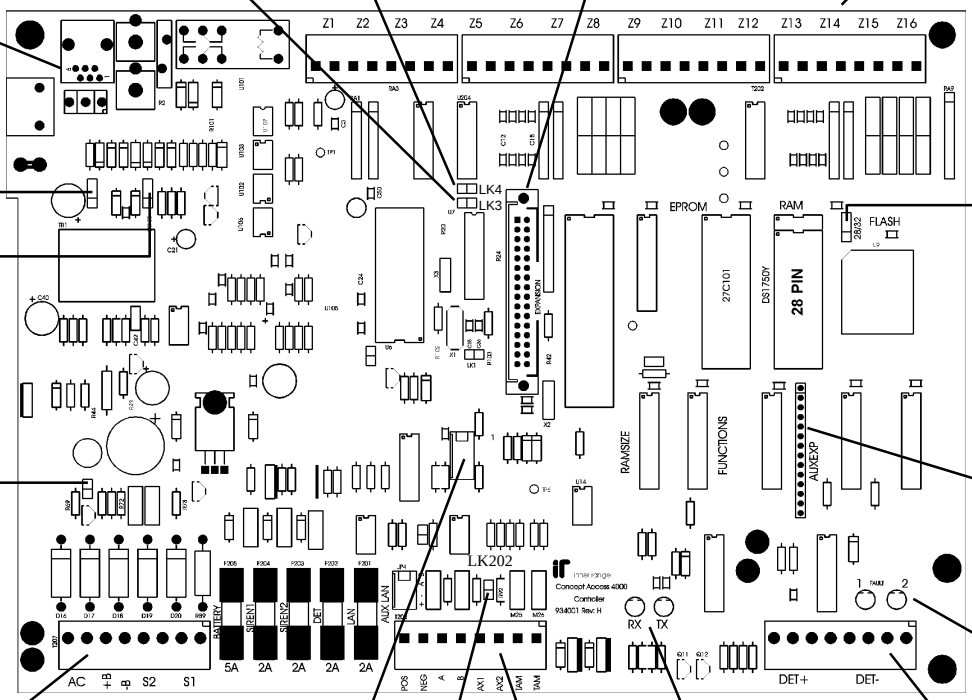
JP2 Expansion Port UART Interface connection.

JP101
Mode 3 Line Socket for connection to Telecom Line. (Cable supplied)
See "DIALLER LINE" on p4 for wiring diagram

LK104

LK105
PSTN Both 2-3.
Direct Line Both 1-2.

LK201
Regulated P.S. Current Limit
No Link Plug pack (normal-1.0Amp)
Link IN 1.5Amps (Custom Ext. Power supply only)



T207 Power Supply & Sirens

AC Plug pack connections. *(See Notes)*
B+/B- 12V 6.5AH Battery.
S1 Internal Siren output
S2 External Siren output

JP1 Port 0
See notes

LAN Activity LEDs
Rx =Receive Data
Tx =Send Data

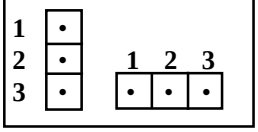
LK202 LAN Termination.

No Link Unterminated
Link IN Terminated. (Only if module is at either end of the LAN)

T205 LAN, Auxiliary outputs & Cabinet Tamper input. *See Notes.*

T201 to T204. Zone Inputs.
See "ZONE INPUT WIRING" on p3 for details.

JUMPER LINK ORIENTATION



LK2 RAM Configuration

2-3 32k DS1230Y (28 Pin)
1-2 128k DS1245Y (32 Pin)
1-2 512k DS1247Y (32 Pin)
Note orientation and position of 28 Pin IC in bottom of socket.

JP3 Auxiliary Expander Header connection for IRA3000 8 Auxiliary Expander.

CONTROL MODULE FAULT LED DIAGNOSTICS
See table on this page.

T206
Detector Power connections.

CONTROL MODULE FAULT LEDs

LED1	LED2	EXPLANATION / REMEDY
ON	OFF	Ram Fault. RAM faulty, in backwards, out by one pin or LK2 not correct. Power off, fit correctly or replace.
OFF	ON	Non-volatile RAM not initialised. Short LK4 to continue. (Erases all programming)
ON	ON	Configuration Problem. Return options memory chip to Distributor.
Fast Flash	OFF	Hardware Problem. (EEPROM) Return unit for service.
OFF	Fast Flash	Wrong GAL for NVRAM size. (Illegal Memory size) Contact the Distributor.
Fast Flash	Fast Flash	Wrong GAL for required options. (Illegal option/s) Contact the Distributor.
Fast Flash	ON	Faulty Program chip. (EPROM) Return unit for service.
ON	Fast Flash	No default for installer code. Short LK4 to continue. Contact Owner/Master Code holder.
Slow Flash	Slow Flash	Secure Micro Version wrong. Contact the Distributor.
Slow Flash	ON	Lock bits not set. Contact the Distributor.

EXPANDER / READER MODULE FAULT LEDs

RX	TX	EXPLANATION / REMEDY
ON	ON	Module is un-addressed.
OFF	ON	Module type unknown. Firmware upgrade required to Control Module.
Flash	ON	Duplicate Module. This module number is already in use by a module of the same type.
Flash	Flash	Module number selected is too big for Control Module RAM size. Select a lower Module number.
ON	OFF	Too many modules on Network for Control Module RAM size.

LCD TERMINAL ERROR MESSAGES

MESSAGE	EXPLANATION / REMEDY
No Rx	Terminal requesting address from Control Module, but no reply being received.
Can't Tx	Terminal cannot send data because LAN is being held in "start" condition. Check for A/B reversed.
Exists	Module number selected already being used by another LCD Terminal. Choose another number.
Too Big	Module number selected is too big for Control Module RAM size. Select a lower Module number.
Too Many	Too many modules on Network for Control Module RAM size.

LAN SYSTEM OVERVIEW

The 3000/Access 4000 LAN (Local Area Network) is a 3 or 4 wire network used to connect the modules in a system.
Up to 250 modules can be connected on the LAN system, comprising up to 99 modules of any particular type. Using the recommended cable types, modules on the LAN can be installed many hundreds of metres from the Control Module.

Data encryption ensures secure LAN communications at all times, while the programmable supervisory polling system continuously monitors the network to detect cable tamper, cable fault conditions, module off-line and module substitution. The data format used in the 3000/Access 4000 LAN has been developed to ensure fast, reliable communications regardless of the size of the system.

For larger systems and complex sites, LAN Isolators are used to provide opto-isolation between sections of the LAN, eliminate potential earth loop problems, improve surge and lightning protection, provide signal level restoral for improved performance over longer cabling distances and offer a monitored "loop" LAN wiring option for a higher level of LAN integrity.

CONNECTING MODULES TO THE LAN. ***Refer to diagram opposite.***

- "A" & "B" signal connections are wired in parallel across the system using twisted pair cable. ❶
  See "Cable Types" details on page 12.
  The "NEG" connection (0V reference) must also be wired to every module. ❷

- An optional + 12 V connection (LAN +ve) may be used to provide power to modules that do not have their own Plug pack and on-board power supply. e.g. LCD Terminals. ❸

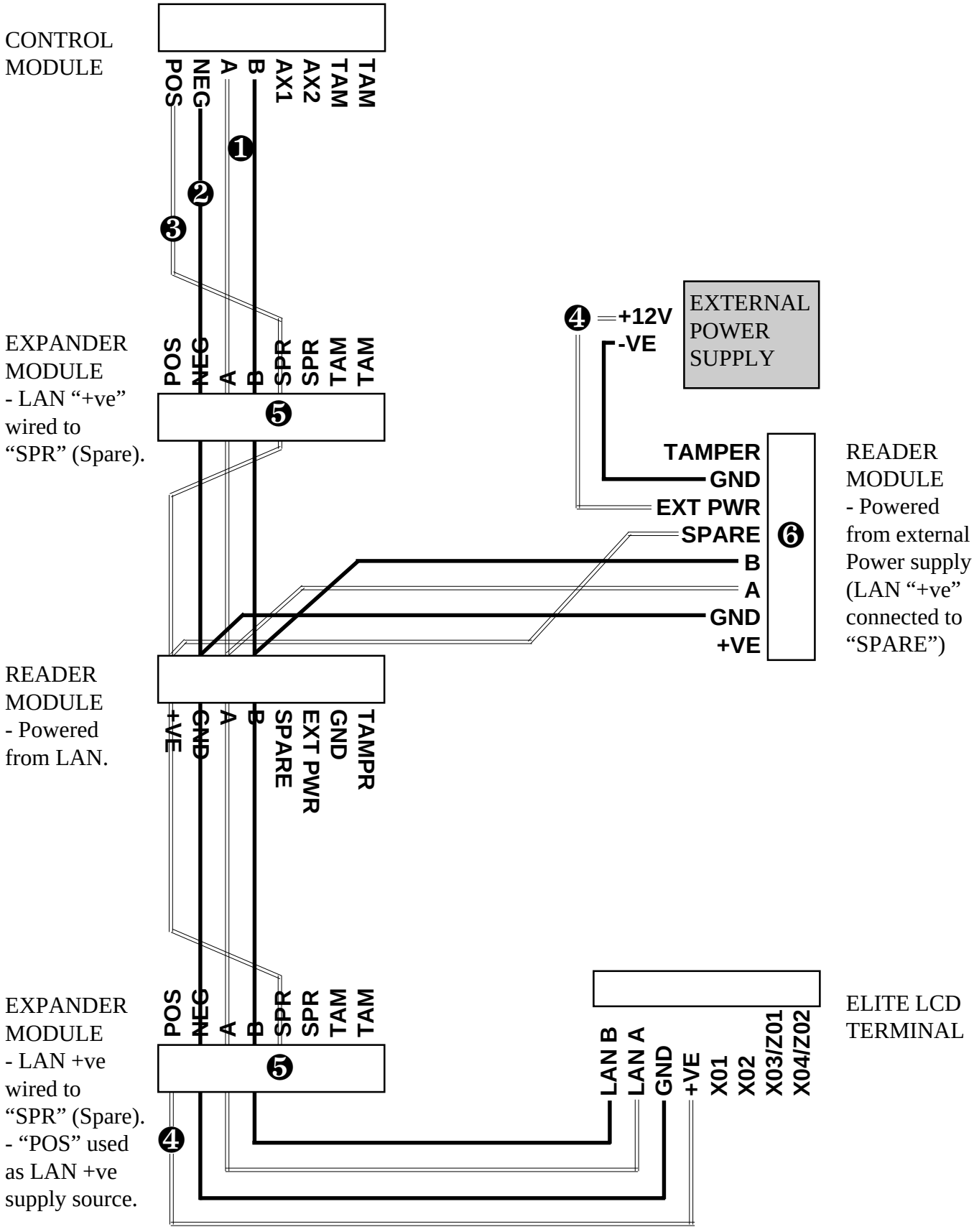
- The + 12 V connection (LAN +ve) used to power LCD Terminals, etc. can be derived from any module with it's own Plug pack and on-board power supply (Control Module and Expander Modules), or from a separate external power supply. ❹
  CAUTION ! Never connect the +ve (POS) of two power supply sources together. i.e. Control Module LAN POS, Expander Module LAN POS, or External Power Supply +ve. This is one of the reasons that "SPARE" wiring terminals are provided on most types of modules.

- When wiring the LAN to modules that are powered from their own Plug pack (e.g. Zone Expanders), use the "Spare" terminal (labelled "SPARE" or "SPR") for the LAN +ve connection. ❺
  NOTE: LAN "POS" and "NEG" should not be used to power detectors, relays, etc. Always use "DET+" and "DET-" on the module to power these devices.

- When wiring the LAN to modules that are powered from an external Power Supply (e.g. Reader Modules), use the "Spare" terminal (labelled "SPARE" or "SPR") for the LAN +ve connection. ❻

- A DC Voltmeter may be used to check that the LAN will operate reliably. *See "LAN Voltage Testing" on Page 16.*

Connecting Modules to the LAN.



CABLE TYPES

- TWISTED PAIR Cable MUST be used to connect the LAN.
  Two pair Telephone or LAN cable is suitable as it provides all 4 conductors required. One twisted pair for "A" & "B", and the other for "POS" & "NEG". Unshielded cable is quite acceptable, however, in situations where electrical storms or high levels of electrical interference are a problem, shielded 2 pair cable may be used. Examples of suitable 2 pair cables:

Unshielded. ***Figure 1.***	Shielded (All Multistrand) ***Figure 2.***	
Olex TJC590AA002	Olex JEIP87AA002	Belden 8723 *
Tycab TIC6105 †	Tycab DPF4702	Tycab DQQ47025 *
MM MegaTwistpatch ‡	MM B2002CS	Garland MCP-2S

† 3 Pair.
‡ Multistrand (7/0.2).
* Indivually screened pairs.

- If SHIELDED CABLE is used, DO NOT use the shield as a negative connection & do not allow the shield to make contact with Negative, Ground, or any other wiring or metalwork within the system. Shields should only be terminated to a Protective Earth at ONE END of the cable. ❶ *See "System Earthing" below.* If no suitable earth point is available at a module location, the shield can be looped back to the shield of the previous length of cable. ❷

- LAN POWER CABLING. Separate heavy duty Figure 8 cable (24 / 0.20 recommended) should also be run for "POS" & "NEG" over longer distances if used for powering modules. e.g. LCD Terminals. ***Figure 3.***

LAN "POS" current required:	**Max. Cabling Length for LAN +ve (POS) & GND (NEG)**		
	Twisted pair	Fig 8. 14 / 0.20	Fig 8. 24 / 0.20
60mA (e.g. 1 LCD Terminal)	200 metres	400m	640m
120mA (e.g. 2 LCD Terminals)	100 metres	200m	320m
180mA (e.g. 1 Reader Module - Reader pwr not incl)	62metres	130m	210m
250mA (e.g. 4 LCD Terminals)	50 metres	100m	160m
500mA (e.g. 8 LCD Terminals)	25 metres	50m	76m

Remember to allow for any extra current required by Detectors, Auxiliaries, Readers, etc:
NOTE: Lock strikes must not be powered from the LAN.

Relay (1A contacts)	approx. 25mA	Small Proximity reader (~10cm read range)	~50 to 120mA
Relay (5A contacts)	approx. 45mA	Standard Prox reader (~15cm read range)	~120 to 180mA
PIR	15 to 25mA typical.	Magnetic Swipe reader.	~15mA

Figure 1.
Twisted pair communications cable.

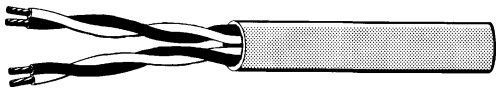


Figure 2.
Shielded, twisted pair communications cable

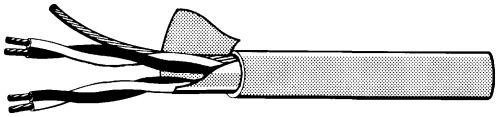


Figure 3.
Heavy duty Figure 8 cable. **24 / 0.20**
Used for LAN +ve & GND on long cable runs.

SYSTEM EARTHING

- DO NOT CONNECT A SYSTEM TO EARTH. This includes all Modules, Input, & Output devices. Plug packs do not have an earth wire as earthing is not required. Also ensure that mounting screws etc., or peripherals connected to modules do not provide an earth connection to the module. This is to avoid earth loops occuring.

- A Printer, PC, modem, etc. connected to the Control Module may provide a connection to earth via the Serial cable. This is acceptable but is the only exception to the above rule.

- LIGHTNING PROTECTION. In multi-building installations and on longer cable runs, shielded cable may be used to provide added protection against lightning strike. Each individual shield should be terminated to a Protective Earth point such as an earth stake, building earth (metal building framework) or water pipe. ❶ It is very important to ensure that the shield makes no contact with Negative, Ground or any other wiring within the system.
  LAN Isolator/s can also be included in a Lightning protection scheme to electrically isolate different sections of the LAN at the point where LAN cabling enters/exits each building, or on cable runs that are more exposed to lightning strike.

SYSTEM CABLING CONFIGURATION ***Figure 4 & Figure 5.***

- Avoid installing the LAN cable with mains power cables & any other cables likely to cause interference wherever possible

- No module is to be more than 1.5km (1500 metres) cable length from the Control Module OR from a LAN Isolator "LAN 2" or "LAN 3" Port. ❸ (LAN Isolator/s can be used to extend the maximum cabling distance)

- TOTAL LAN CABLING in a system without LAN Isolators should not exceed 2000 metres, and/or 64 Modules. ❹
  If the total amount of LAN cable will exceed 2000 metres, and/or there are more than 64 modules to be connected, LAN Isolator/s must be used to separate the LAN system into sections and maintain optimum LAN performance. i.e. Include one LAN Isolator for every 2000 metres of LAN cabling and/or for every 64 Modules connected. ❺

LAN TERMINATION ***Figure 4 & Figure 5.***

- The LAN MUST be Terminated for optimum performance, by ensuring that the Termination Resistor (470 Ohm*) is "IN" on the first and last modules in the LAN network. Terminated modules are indicated with a "**T**" on the illustrations. ❻
  (Termination is put "IN" with a jumper link or a DIPswitch, depending on the module type) ** See Note 1 on Page 15.*

- MULTIPLE CABLE RUNS. In systems where there are multiple cabling runs going out from the Control Module or LAN Isolator (i.e. "star" configuration), Termination is fitted on the modules at the end of the two longest runs. ❼

Figure 4.
Simple LAN configuration.

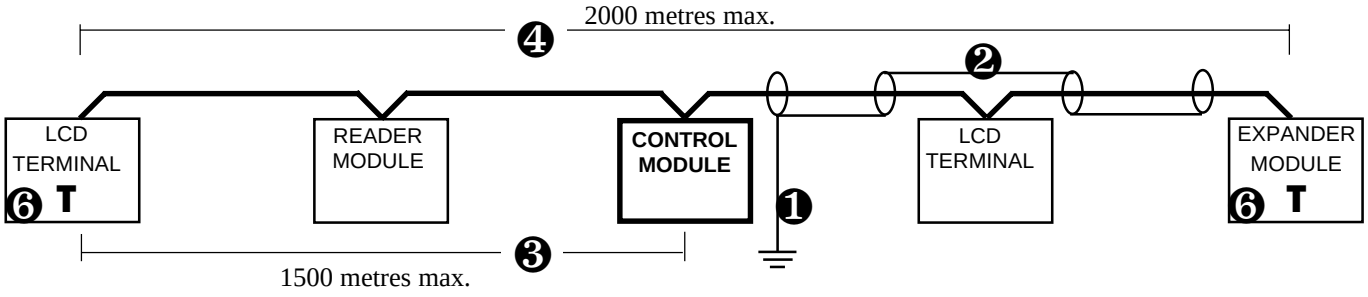
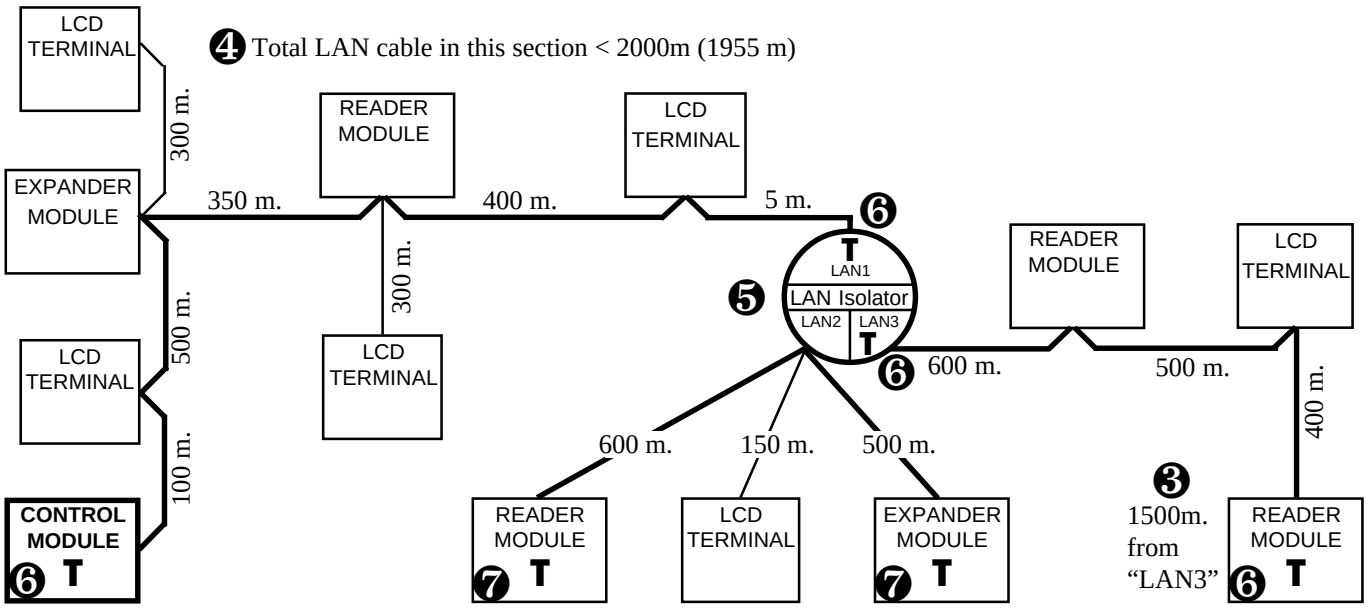


Figure 5.
Complex LAN configuration.



LAN TROUBLESHOOTING FLOWCHART

BEFORE SYSTEM POWER UP
(No Power connected to modules
AND No batteries connected)

A1. WHERE POSSIBLE, PHYSICALLY CHECK:
-LAN A & B connections not reversed on any module.
-No modules connected to earth. (via mounting bolts, ext. power supplies, input/output cabling, etc.) Note that the Control Module may be connected to earth via external equipment connections. i.e. Printer, PC, modem, etc. If so, this must be the only earth connection in the system.
-Only two modules in the system are terminated.

⇓

A2. CHECK FOR SHORT CIRCUITS ON THE LAN
(No Power connected AND No batteries connected)
METER ON OHMS RANGE
Check at the Control Module for short circuits between:
-LAN A & B.
-LAN A to +ve and -ve.
-LAN B to +ve and -ve.
Note:DC Resistance in the LAN cable (~0.18Ohms/metre) can mask short circuits that exist on longer cable runs.

⇓

A3. CHECK FOR CORRECT LAN TERMINATION
(No Power connected AND No batteries connected)
METER ON OHMS RANGE
Measure between LAN A & LAN B on the Control Module:

170 to 300 Ohm.*	OK. (System with up to 32 modules)
140 to 270 Ohm.*	OK. (System with up to 64 modules)
Lower value.	More than two modules terminated or Short cct across LAN A & LAN B.
Higher value.	Less than two modules terminated or Open cct on LAN A &/or B wiring.

** See Notes 1 & 2.*

⇓

POWER UP SYSTEM & CONNECT BATTERIES

A4. CHECK CONTROL MODULE OPERATION

DC POWER CHECK. With Meter on DC Volts range, measure between LAN +VE & LAN -VE (GND) on the Control Module:

11V to 14V.	OK.
<11V.	Too many devices being powered from the Control Module or Battery Flat.

Check FAULT LEDs on Control Module:

Both Off.	OK. *Proceed to step A5.*
Any other state.	Refer to "*Control Module Fault LEDs*" table on Page 9.

⇓

A5. DETERMINE THE TYPE OF LAN PROBLEM

A. SOME MODULES HAVE INTERMITTENT COMMUNICATIONS PROBLEM.
Proceed to Step B1, "Intermittent LAN problems". ⇒

B. SOME/ALL MODULES NOT COMMUNICATING AT ALL. *Proceed to Step A6.*

⇓

A6. IS THE LAN COMPLETELY DEAD ?

YES. *Proceed to Step C1, "LAN Dead".* ⇒ ⇒

NO. (Some Modules not communicating, others OK)
Proceed to Step A7.

⇓

A7. CHECK STATUS OF PROBLEM MODULE/S

DC POWER CHECK. Meter on DC Volts range. Check for 11 to 14 Volts between LAN +VE & LAN -VE (GND) on the problem module. *See Note 3.*

Check FAULT LEDs (TX & RX LEDs) OR LCD Display on problem Module:
Both LEDs Off OR Display has no "Module ..." messages. *Proceed to step A8.*

Any other state. Refer to "*Expander/Reader Module Fault LEDs*" table or *"LCD Terminal Error messages"* table on Page 9.

⇓

A8. TEST LAN VOLTAGES AT PROBLEM MODULE/S

Perform LAN Voltage Checks at the problem Module/s. Refer to the table *"LAN Voltage Testing"* on Page 16.

⇓

A9. SUBSTITUTE MODULE/S

If the troubleshooting procedure fails to locate any power, wiring or termination problems, you may have an equipment fault. Replace the module/s suspected of causing the problem.

⇒ ⇒ ⇒ ⇒ ⇒

LAN DEAD

⇒ **C1.** TEST VOLTAGES AT CONTROL MODULE

Perform LAN Voltage Checks at the Control Module. Refer to the table *"LAN Voltage Testing"* on Page 16.

If this fails to locate the problem, *proceed to Step C2.*

⇓

C2. ISOLATE PROBLEM CABLING OR MODULE/S

Disconnect all LAN wiring from Control Module. Reconnect one LCD Terminal and ensure that it communicates. (If it doesn't, follow Steps A7 & A8)

Reconnect the LAN one module at a time until a problem module, or section of cabling kills LAN communications when reconnected.

With the problem area identified, *proceed to Step A8.*

⇓

⇐ ⇐ ⇙ ⇐ ⇐ ⇐

INTERMITTENT LAN PROBLEMS

B1. WHICH MODULES ARE INTERMITTENT ?

Using an LCD Terminal or Review Logging via Upload/ Download software, check Review Data for "Module Lost" and "Module Found" messages.

Each message will also identify the Module type and number. Note the problem module/s.
Proceed to Step B2.

⇓

B2. IS ANOTHER EVENT CAUSING THE MODULE TO BE LOST ?

Look at the Review Messages immediately preceding the "Module Lost" messages for any event that repeatedly coincides with the loss of module/s, or if the loss of module/s occurs at, or around, the same time of day. Look for messages such as Door Un-lock/Lock, Siren On, Auxiliary On, etc., and note the times when the "Module Lost" messages occured.

YES. Ancillary devices & external equipment (e.g. electrical machinery) can produce voltage spikes, electrical noise and excessive current drain.
If the LAN, Power & Auxiliary circuits are not wired correctly or Earth loops exist, these devices can interfere with LAN communications.

If such an event does coincide with loss of comms, reproduce the sequence of events to confirm the effect, then check any associated wiring circuits accordingly.

NO. *Proceed to Step A8*

NOTES:

1. LAN TERMINATION CHECK
Very early 3000 products (Australia & NZ only) had 120 Ohm Termination resistors which results in lower measurements (~70 to 140 Ohms). When expanding these systems, take termination OUT on the existing modules, and put termination IN on two of the new modules. Alternatively, take termination OUT on the existing modules and fit a 470 Ohm resistor between LAN A & B on those two modules instead. NOTE: This is only necessary if expanding the system, or if there are communication problems. If the system is operating reliably, no modification is necessary.

2. TERMINATION RESISTOR CHECK
To determine if a module is fitted with a 120 Ohm or 470 Ohm Termination Resistor, ensure that TERM is "IN", disconnect the module from the LAN, remove power, and measure across LAN A and B on the module with the meter on the OHMS range.

3. MODULE POWER TEST
The Test Menu can be used to check LAN Power conditions. Logon to the LCD Terminal, then press <MENU>, 4, 8. This activates the power test, and the results will be displayed on the LCD Terminal, and in the review memory. See "Concept 3000 Programmer's manual" Rev 2.3 p154 for more information.

LAN VOLTAGE TESTING

NOTES:

1. These Voltage checks should be done with no (or minimal) communications traffic on the LAN. To ensure this:
   a) Check that poll times for all addressed modules in the system are set to the default 60 / 120 seconds or greater.
   b) Disconnect LAN A and LAN B from any unaddressed modules on the LAN, as these modules will be constantly attempting to send messages to the Control Module.
   c) Ensure that Terminals, Readers, etc. are not being used while performing tests.
   Before proceeding with Voltage tests, check the "RX" LED on the Control Module to confirm that there is minimal LAN activity.

2. To determine if a problem exists on the module under test, or elsewhere on the LAN, these voltage tests can be performed:
   a) With the module connected to the LAN.
   b) On the cable connections with the module disconnected from the LAN.

Test Point + PROBE	**Test Point - PROBE**	**EXPECTED RESULT**	**PROBLEM/ REMEDY**
LAN +ve	LAN -ve or GND	11V to 14V DC	**0V.** Open circuit LAN +ve connection, or short cct between LAN +ve and LAN -ve. **<11V.** Too many modules powered from the LAN power supply source. Length (or guage) of LAN cabling causing excessive Voltage drop on the cable.
LAN B	LAN A	200 to 400mV DC	**<200mV.** Short cct between LAN A & B. More than 2 modules terminated in this section of LAN. **>400mV.** LAN A &/or LAN B Open circuit. Less than 2 modules terminated in this section of LAN **<0V (Negative reading)**. LAN A & LAN B connections reversed.
LAN A	LAN -ve or GND	200mV to 2.5V DC	**<200mV / >2.5V DC.** System may have more than one module connected to an earth point, causing earth loop/s. Ensure that no more than one module in the system is connected to earth. Remember that a module may be connected to earth via a peripheral device or it's cabling. e.g. PC, Printer, External power supply, Detector, Output device, etc. If installation methods &/or system configuration makes multiple earth points unavoidable, install LAN Isolator/s at suitable points in the LAN system to isolate the earthed section/s
LAN B	LAN -ve or GND	200mV to 2.5V DC	As above.

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